2.1.4. Materials Prone to Charge Accumulation. Materials prone to static charge accumulation, such as common plastic, rubber, silk and paper, should never come in contact with ESD sensitive devices.

2.1.5. Operator's Clothing. All personnel handling ESD sensitive items shall wear approved antistatic conductive smocks.

Operators at static free work stations must be especially careful to prevent any static-sensitive items being handled from touching their clothing. Close-fitting short-sleeved shirts are recommended. Long sleeves, however, must be rolled up and covered by an ESP smock

Only ESP approved smocks, gloves, or finger cots shall be worn when handling or processing unpackaged ESD sensitive devices, never nylon or rubber.

2.1.6. Non Allowed Plastic Material. All plastic except approved metallized antistatic poly items shall be kept well clear of static-free work stations. The following are commonly used items which can damage static-sensitive devices and should not be allowed in a static-free work station:

Plain plastic trays, tote boxes, vials, common bubble-type transparent cushioning materials; plastic drinking cups, styrofoam cups; plastic covers for process instructions; cigarette packages in cellophane wrappers; any plastic food bags or packages; plastic purses and plastic ash trays.

2.1.7. Cleaning Brushes. Only natural bristle brushes shall be used for cleaning or conformal coating of ESD sensitive components or assemblies. Acid brushes made of synthetic bristles shall not be used.

2.1.8. Relative Humidity. The relative humidity in a static-free area shall be maintained around 40% since static generation increases exponentially as the relative humidity decreases. Too high humidity causes oxidation.

2.1.9. Storage of ESD Sensitive Components. All ESD sensitive components or assemblies shall be stored in metallized shielding bags with the opening folded over. The protection shall be maintained at all times except when the item must be actively worked on. The leads of ESD devices may be inserted into conductive cushioning material, if required, prior to being bagged. ESD components may be stored in the original manufactures supplied packaging.

CAUTION

ESD sensitive devices and assemblies shall never be removed from their protective package except at a static-free work station and with the precautions described herein.

2.1.10. Grounding Straps. Shunt (shorting) clips shall be used to electrically short all PC board terminals together and must not be removed until the item is about to be installed into a wired circuit or receptacle. These clips shall remain in place during all in plant transport, handling, and storage, in addition to the boards being bagged.

CAUTION

When handling ESD sensitive items, personnel shall be grounded with a wrist strap which must be worn in direct contact with the bare skin, never over clothing. Anyone not grounded with a wrist strap shall never touch the ESD sensitive devices at a static-free work station.

2.1.11. Work Habits. In the vicinity of unprotected ESD sensitive devices, avoid activities which tend to be friction producing such as putting on or taking off smocks, wiping feet, rubbing hands, etc.

- Avoid touching leads or contacts even though grounded. Board assemblies shall be handled by their edges when ever possible. Handle parts by their case whenever size permits.
- All drawings, manufacturing instructions, visual aids, procedures, etc., used at a static-free work station shall be contained in approved antistatic envelopes, never in common vinyl or acetate covers.
- Develop the habit, of first touching the grounded bench top before handling ESD sensitive items. This precaution should be observed in addition to wearing a wrist strap.
- The metal portion of small tools picked up for hand use must be touched to the antistatic bench top before use to assure the discharge of all static electricity. Only uninsulated hand tools shall be used. These metal hand tools (tweezers, lead forming tools) need not be grounded but shall be placed on the grounded work surface when not in use.
- No food/drinks or smoking is allowed in workshop.
- Workshop shall be kept in a clean and tidy state at all times.

3.0. CEU UPGRADE.

3.1. Introduction. The CEU is to be upgraded by installing a new Motherboard CCA, a new Sensor Input CCA and a reprogrammed Memory CCA.

3.2. Supplies. See Table 4-1.

Table 4-1. CEU Modification Kit (12993556)

Item No.	Description and Part No.	Quantity
1	CCA Junction, 12925892	1
2	Sensor Input CCA, 12925896	1
3	Plate, Identification, 12285280	1
4	Diode Semiconductor, JAN IN4942 (MIL-S-19500/359)	2
5	Washer, Lock (MS 35333-38)	28
6	Washer, Lock (MS 35338-136)	10
7	Washer, Lock (MS 35338-134)	10

3.3. CEU Operating Condition.

A. Ensure exterior of CEU is clean prior to upgrade.

NOTE

If operating condition of CEU is unknown, test the CEU on DSESTS prior to upgrade.

B. Check CEU to ensure that previous wiring harness modification has been applied.

C. Visually inspect wire between connector pins J1HH and J3r for physical damage.

D. Check for continuity between connector pins J1HH and J3r. If there is no continuity inspect and repair defective wire.

3.4. Electrical/Mounting Base or Access Cover Removal and Replacement.

NOTE

Use this task to remove and replace base (1) and cover (2). Base (1) is shown.

REMOVAL

A. Remove cover (2).

1. Remove 14 screws (3), lock washers (4), and washers (5). Remove cover (2). Discard lock washers (4).

B. Inspect parts for damage. Re-place as required.

REPLACEMENT

A. Install cover (2).

1. Position cover (2) on computer electronic unit (6).

2. Loosely install 14 screws (3), new lock washers (4), and washers (5).

B. Push down on center of base (1). Tighten four screws (3) in holes (7 through 10), in that order.

C. Torque screws (3) to 16 lb-in (1.8 N·m) in holes (11 through 18, 9, 10, 7, 8, 19, 20), in that order.

3.5. Removal and Replacement of A1 Through A7 CCAs.

REMOVAL

NOTE

Use this task to remove all CCAs. A1 CCA (1) is shown.

CAUTION

Some parts on CCAs may be damaged by static electricity if not handled properly. Do not touch any electrical components on CCAs. Hold CCAs by edges only.

A. Remove CCA (1).

1. Loosen two captive screws (2).
2. Pull straight up on two extractors (3) and remove CCA (1).
3. Place CCAs in an electro-static envelope.
4. Put A7 CCA to one side for disposal.
5. Place A3 CCA aside for reprogramming; see para 4.0.

INSTALLATION

A. See Installation of CCA Junction for details of Installation pro-cedures, para 3.6.

3.6. Removal and Installation of CCA Junction (Modification Kit, 12925892).

REMOVAL

A. Remove plate (1).

1. Remove 10 screws (2), lock washers (3), and washers (4) from recepta-cle connector bodies P8 (5), P6 (6), P4 (7), P7 (8), and P5 (9). Discard lock washers (2).

2. Remove connector bodies (5 through 9) from plate (1).

3. Turn CEU (10) over.

4. Remove 10 screws (11), lock washers (12), and washers (13). Remove plate (1). Discard lock washers (12).

5. Put CCA Junction aside for disposal.

INSTALLATION

NOTE

Prior to performing instal-lation, inspect to see if retrofit diodes have been added to chokes L1 and L2. If diodes are not present, see para 3.7. for installation procedure.

A. Install CCA Junction (1).

1. Position CCA, Junction (1) in unit (10). Loosely install 10 screws (11), new lock washers (12), and washers (13).

2. Turn unit (10) over. Position connector bodies (5 through 9) on CCA, Junction (1). Install 10 screws (2), new lock washers (3), and washers (4).

CAUTION

Some parts on CCAs may be damaged by static electricity if not handled properly. Do not touch any electrical components on CCAs. Hold CCAs by edges only.

B. Install CCA Junction (1) as shown in Table 4-2.

Table 4-2. CEU CCA Table

CCA Number	CEU Before Mod 9376750	CEU After Mod 12925899
A1	12279321	12279321
A2	12279623-1	12279623-1
A3	9376752	12925890
A4	12279466	12279466
A5	12279639	12279639
A6	9376745	9376745
A7	9376743 or 12279627	12925896
CCA Junction	12279672	12279892

1. Position CCA Junction (1) in slot (4) and push down on two ex-tractors (3).
2. Tighten two captive screws (2).

C. Procedure.

1. Install A1 and A7 CCAs. Move CCA, Junction (1) as needed to install A1 and A7 CCAs (14, 15).

D. Turn unit over and tighten 10 screws.

E. Install A6, A5, A4 and A2 CCAs.

F. Install a re-programmed version of the A3 CCA into slot A3, PN 12925890.

NOTE

Procedure for the programming of A3 CCA is contained in this chapter (see para 4.0.).

G. Install electrical mounting base (see para 3.2).

3.7. Adding Retrofit Diodes.

3.7.1. This step describes the procedure for adding the retrofit diodes to the CEU.

NOTE

On some CEUs, the retrofit diodes may have previously been added. This may be visually verified by comparing the CEU to the illustration in Figure 4-2. The diodes are mounted on a choke assembly which is mounted on the interior wall of the CEU housing immediately above connector J1. If the diodes are installed proceed to installation of CCA Junction.

CAUTION

This section MUST be performed at an approved static protection work station. The technician must be connected to an approved grounded wrist strap. Serious damage may occur to the sensitive internal components of the CEU if these precautions are not followed.

3.7.2. Procedure. Position the CEU so that the connectors are facing away from you.

A. The choke assembly will be positioned at the top right of the inside of the plate holding the connectors.

B. Switch on the soldering iron and allow it to preheat to 825 degrees Celsius.

C. Place splash shield in CEU as shown in Figure 4-1 if CCAs are not removed.

D. Select two diodes type JAN IN4942 from retrofit kit. Compare diodes to those shown on Figure 4-2. Install insulation sleeving (approximately 3/4 inch in length) on each of the two diodes. Shape using needle nose pliers.

E. Install the diodes on the CEU choke assembly in the position and polarity shown in Figure 4-2.

F. Using a cotton swab, acid brush, and Acetone clean excess solder flux from the four solder joints.

G. Remove the solder splash shield (if used) being careful not to let any loose pieces of solder fall into the CEU.

H. Enter an update to show that diode modification is completed on the upgrade form per SOW para. C.2.1.

J. Switch off soldering iron (if finished using for more than ten minutes).

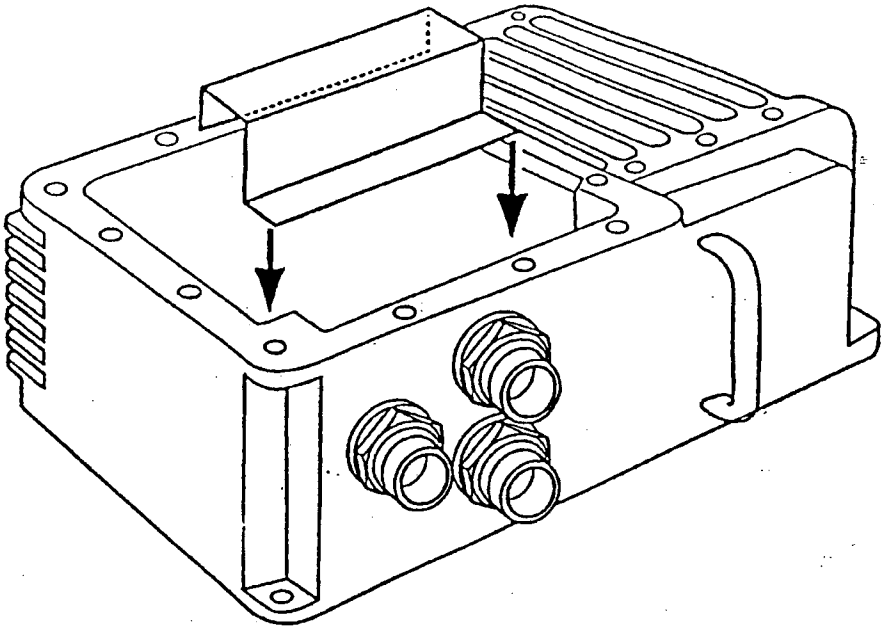


Figure 4-1. Solder Splash Shield

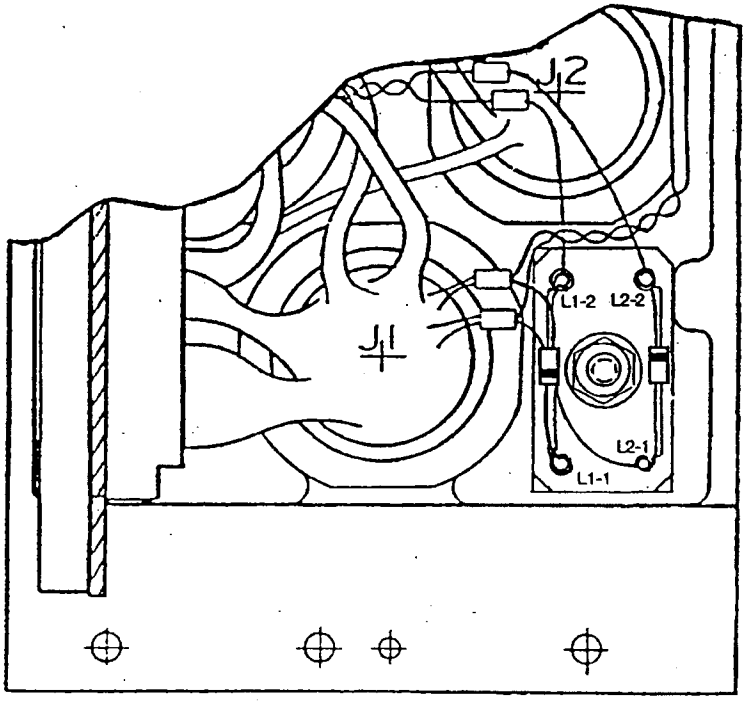


Figure 4-2. Connector Plate Diode Polarity

3.8. Removal and Installation of CEU Identification Plate.

REMOVAL

A. Remove Plate (1).

1. Scrape plate (1) off CEU (2).

2. Clean CEU (2). Use Acetone and rag.

INSTALLATION

A. Install New Plate (1), (part number 12285280).

1. Peel protective backing (3) off plate (1). Apply Acetone to back of plate (1) until adhesive becomes tacky. Use acid brush.

2. Install plate (1) on CEU (2). Wipe dry using a rag.

B. Test CEU using DSESTS or BIT Test in Tank.

3.9. Ensure that all details of this upgrade are recorded on form per SOW para.C.2.1.

4.0. A3 CCA MODIFICATION.

CAUTION

Some parts on A3 CCA may be damaged by static electricity if not handled properly. Do not touch any electrical components on CCA. Hold CCA by edge only.

4.1. Modification Procedure for A3 CCA.

A. Using approved ESD procedures remove the UV filter labels from the individual EPROMs on the A3 CCA. Clean off remaining adhesive with a wiping rag soaked in Acetone. Place the CCA under an ultraviolet light source (supplied with MPU 1-2) for approximately 10 minutes.

B. Using an Approved Master Memory Reprogrammable CCA in the MPU 1-2 follow the procedure in Section 3 of Document 959421, which will be supplied with the MPU 1-2s to the successful contractor

C. Install a Label P/N 9376705 over the windows of the six EPROM devices. Re-identify the A3 CCA by affixing Label P/N 12925903 over the existing part number on the CCA stiffener.

D. Document serial number and date of modification on form per SOW para. C.2.1.

NOTE

Verify master CCA to master CCA each time MPU 1-2 is set up.

5.0. GAS UPGRADE.

N/A

6.0. GPS LOWER PANEL UPGRADE.

Supplies: See Table 4-4.

Table 4-4. GPS Modification Kit (57K4103)

No.	Description and Part Number	Quantity
1	Decal 12960837	1
2	Brushing 19207-12304761-2	1
3	Switch 19207-12931817	1
4	Packing, Preformed MS9021-030	1
5	Knob MS91528-2L4B	1
6	Housing LH89/I	2
7	Lamp MS25237-327	2
8	Lens LC35GN2	2
9	Boot M5423/09-02	1
10	Clamp MS21333-69	1
11	Switch, Adapter 19207-12906831	1
12	Washer, Lock MS35333-71	1
13	Gasket 19207-12311344	1

Tools: Drill Fixture (PN PE3135)
Electrical Test Fixture (PN PE3260)

6.1 Introduction. The modification of the GPS Lower Panel consists of replacing the ammo select toggle switch with a 4-position rotary switch, S3 and installing two new lamps, DS9 and DS10 to indicate new ammunition types.

6.2 Modification of Lower Panel.

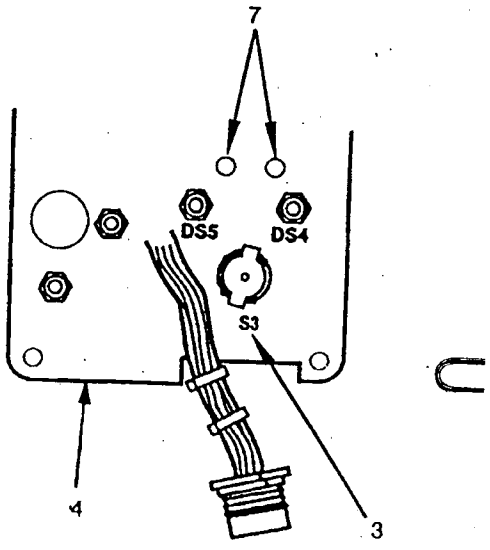
NOTE

Ensure that wires at rear of Lower Panel are pushed away from area behind new holes to allow drill bit sufficient clearance.

A. Drill holes in Lower Panel.

1. Using drill fixture (PN PE3135) drill two holes (7) in Lower Panel (4) to allow installation of additional ammunition indicator lamps DS9 and DS10.

2. Deburr new holes (7).



95004-062

6.3 Lower Panel, Rear Preparation.

A. Remove and dispose of old gasket.

B. Clean glue off rear of Lower Panel. Repeated application of Acetone or equivalent with a brush or rag and energetic scrubbing may be necessary.

6.4 Toggle Switch (S3) Removal.

A. Cut heat shrink from wires (2). Detach three electrical wires (2) from terminals (3) on back of switch (1) and tag wires (2).

B. Remove jam nut (5), lock washer (6), dust, moisture boot (7), and key washer (8) from switch (1).

C. Remove tie-wraps or lacing cord (4) from switch (1) and wires (2).

6.5 Connector J3 Harness Removal.

A. Remove screw (1), lock washer (2) and securing clamp (3) from standoff on Lower Panel (4). Discard clamp (3) and lock washer (2).

B. Remove heat shrink sleeving or tape (5) from wiring harness (6).

C. Remove tie-wraps or lacing cord that were under heat shrink or tape (5).

6.6 Lower Panel Preparation.

A. Clean front of Lower Panel with soap and water or mild degreaser.

B. Remove designation S3 from front and rear of Front Panel using Acetone or equivalent.

C. Clean area under wires close to Filter Select Hole on the rear of the Lower Panel with Acetone or equivalent.

6.7 Installation of Decals.

A. Install new part number decal (5) on rear of Lower Panel under wires close to Filter Select Hole.

B. Install new decals, DS9 (1), DS10 (2), and S3 (3) on rear of Lower Panel (4) as shown.

C. Install new decal, MPAT STAFF (6) on the front of Panel (4) under two new holes.

6.8 Filter Select Hole.

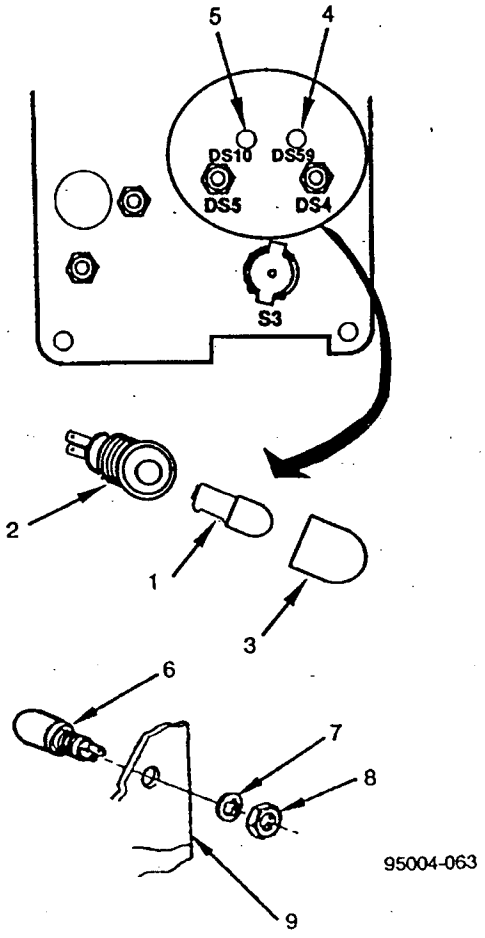
A. Remove and discard old boot (1) and bushing (2) from the filter select hole (3) of Lower Panel (4).

B. Install new boot (1) and bushing (2) in filter select hole (3) of Lower Panel (4).

6.9 Installation of Lamps (DS9 and DS10).

A. Assemble lamp (1) with housing (2) and lens (3) for DS9 (4) and DS10 (5).

B. Install lamp assemblies (6) on Lower Panel (9) and install lock washers (7) and nuts (8). Make sure that the flat portion of the housing is facing the bottom of the Lower Panel (9).



6.10 Installation of New Rotary Switch (S3).

A. Apply glue to spacer (10) and surface on the rear of Lower Panel (12) surrounding S3 hole.

B. Wait for glue to become tacky then insert spacer (10) in hole (1) with key slot in spacer facing bottom of Lower Panel.

C. Install switch (1) through rear of Lower Panel (12). Position the guide switch key (13) in key slot of the spacer.

D. Install new lock washer (6) and nut (5) on switch (1).

E. Install knob (3) on the shaft (4) of switch (1).

F. Hold knob (3) in place and tighten two set screws (2).

6.11 Installation of Wires.

NOTE

- A 1/2 inch length of heat shrink sleeving (1) is necessary for each connection on lamps DS9 (3), DS10 (4) and J3 connector (2).
- Slide heat shrink sleeving (1) over wire (5) and out of the way before making solder connections.

A. Make wire (5) connections according to Table 4-5 with appropriate lengths of 22-gage wire (5).

Table 4-5. Wiring Connections

From	To
GND of DS9	GND of DS10
GND of DS10	GND of DS4
DS9-positive	J3-z
DS10-positive	J3-y
J3-Y (old S3-1)	S3-4
J3-X (old S3-2)	S3-COM
J3-b (old S3-3)	S3-1
J3-a	S3-2
J3-Z	S3-3

B. Cover wires (5) connected from J3 (2) with insulation tape (6) to where clamp (7) will be installed.

C. Install tie wraps (8) or lacing cords every 3/4 inch over insulation tape (6).

D. Tie wrap (8) newly installed wires (5) to restrain movement caused by vibration.

6.12 Clamp Installation.

A. Install new clamp (1) and new lock washer (2) with screw (3) to cable (4) securing J3 (5) to Lower Panel (6).

6.13 Testing Lower Panel.

A. Test Lower Panel.

1. Using electrical test fix-ture (PN PE3260) attach test lead J1 to J3 on Lower Panel.

2. Rotate knob on rotary switch to all four positions. Verify that each indicator lamp illuminates.

6.14 Record.

Ensure all details of the upgrade are recorded on Upgrade form per SOW parag. C.2.1..

CHAPTER 5

DEPOT UPGRADE PROCEDURES

CONTENTS

1.0. INTRODUCTION.

1.1. General. The procedure for Upgrading items in the depot is the same procedure as illustrated in Chapters 3 and 4. The exception being the Unpacking and Repacking of upgraded items.

2.0. GUNNER'S PRIMARY SIGHT (GPS).

2.1. Azimuth (AZ) Drive Assembly Removal and Replacement.

N/A.

2.2. Identification Plate Replacement Procedure.

NOTE

If identification plate (1) is mounted with drive screws (2), do step 1. If identification plate (1) is installed with adhesive, do step 2.

REMOVAL

A. Remove plate (1).

1. Pry under identification plate (1) until heads of two drive screws (2) can be pulled out.

2. Scrape identification plate (1) off GPS body (3).

B. Inspect parts for damage. Replace as required.

INSTALLATION

A. Clean GPS (2) use Acetone and rag.

B. Transfer information from old plate (1) to new plate (1).

C. Peel protective backing (3) off new identification plate (1). Apply Acetone to back of identification plate (1) until adhesive becomes tacky. Use rag.

D Put identification plate (1) on GPS (2) and press in place.

2.3. Documentation. Ensure documentation is complete using Shop Upgrade Form.

3.0. GPS LOWER PANEL ASSEMBLY.

3.1. Procedure. Follow procedures from Chapter 4 and ensure packaging is restored to original condition.

4.0. CEU.

4.1. Procedure. Follow procedures from Chapter 4 and ensure packaging is restored to original condition.

5.0. CCA.

5.1. Procedure. Follow procedures from Chapter 4 and ensure packaging is restored to original condition.

6.0. GAS.

N/A.

NOTE

Restamping of new part number and NSN number shall be added using a die set on the GPS container identification plate.

CHAPTER 6

ACRONYMS AND ABBREVIATIONS

CONTENTS

1.0. ACRONYMS AND ABBREVIATIONS

ACALA	Armament and Chemical Acquistion Logistic Activity
AEI	Armament Enhancement Initiatives
ARI	Anti-Random Imaging
AZ	Azimuth
BCS	Ballistic Computer System
CCA	Circuit Card Assembly
CCP	Computer Control Panels
CEU	Computer Electronics Unit
CFO	Coproduction Field Office
CMO	Coproduction Management Office
CVC	Combat Vehicle Crewman
DU	Depleted Uranium
EL	Elevation
ESD	Electrostatic Device
GAS	Gunner's Auxiliary Sight
GFM	Government Furnished Material
GPS	Gunner's Primary Sight
ICU	Image Control Unit
IGFET	Insulated Gate Field Effect Transistors
LRF	Laser Range Finder
MOS	Metal Oxide Semiconductor
MRS	Muzzle Reference Sensor
NBC	Nuclear Biological, Chemical
NO PIN	Will Not Accommodate the New TRU
NSN	NATO Stock Number
OIP	Optical Improvement Program
PRV	Pressure Relief Valve
SCN	Specification Change Notice
TACOM	Tank-Automotive Command (U.S. Army)
TIS	Thermal Imaging System
TRU	Thermal Receiver Unit